

## CLAIMS:

1. A holographic memory reproduction method, wherein,  
when a diffraction beam is generated in a recording layer of a  
5 holographic recording medium by projecting a reproduction beam  
onto interference fringes formed by projecting an object beam  
and a reference beam onto the recording layer to thereby  
reproduce information from this diffraction beam, a servo beam  
which satisfies the Bragg condition while at least one of the  
10 wavelength, incident angle, and incident direction thereof is  
different from that of the reproduction beam is projected onto  
the interference fringes, whereby the reproduction position  
servo-control of the holographic recording medium is performed  
by means of the diffraction beam generated by the projection  
15 of the servo beam.

2. The holographic memory reproduction method according  
to claim 1, wherein the servo beam is projected along a  
projection optical axis of the object beam and the direction  
opposite to that of the object beam.

20 3. The holographic memory reproduction method according  
to claim 1, wherein the servo beam is projected along a  
projection optical axis of the object beam and the direction  
the same as that of the object beam.

4. The holographic memory reproduction method according  
25 to claim 1, wherein the servo beam is projected along a

projection optical axis of the reference beam and the direction the same as that of the reference beam.

5. The holographic memory reproduction method according to claim 1, wherein the servo beam is projected along a  
5 projection optical axis of the reference beam and the direction opposite to that of the reference beam.

6. The holographic memory reproduction method according to any one of claims 1 to 5, wherein the servo beam is a plane wave having a beam diameter of 1/100 to 1/10 of the beam  
10 diameter of one of the object beam, the reference beam, and the reproduction beam.

7. The holographic memory reproduction method according to claim 6, wherein at least one of the object beam and the reference beam is a non-collimated beam, and the interference  
15 fringes are formed through spherical waves.

8. The holographic memory reproduction method according to any one of claims 1 to 5, wherein the servo beam is projected from a beam source different from that for the reproduction beam.

20 9. The holographic memory reproduction method according to claim 6, wherein the servo beam is projected from a beam source different from that for the reproduction beam.

10. The holographic memory reproduction method according to claim 7, wherein the servo beam is projected from a beam  
25 source different from that for the reproduction beam.

11. The holographic memory reproduction method according to any one of claims 1 to 5, wherein the servo beam is projected by splitting part of the reproduction beam.

12. The holographic memory reproduction method according to claim 6, wherein the servo beam is projected by splitting part of the reproduction beam.

13. The holographic memory reproduction method according to claim 7, wherein the servo beam is projected by splitting part of the reproduction beam.

10       14. The holographic memory reproduction method according to any one of claims 1 to 5, wherein shift multiplex recording is performed two-dimensionally on the holographic recording medium, and two-dimensional reproduction position servo-control is performed on the holographic recording medium by means of the diffraction beam generated by the projection of the servo beam.

15       15. The holographic memory reproduction method according to claim 6, wherein shift multiplex recording is performed two-dimensionally on the holographic recording medium, and two-dimensional reproduction position servo-control is performed on the holographic recording medium by means of the diffraction beam generated by the projection of the servo beam.

20       16. The holographic memory reproduction method according to claim 7, wherein shift multiplex recording is performed two-dimensionally on the holographic recording medium, and

two-dimensional reproduction position servo-control is performed on the holographic recording medium by means of the diffraction beam generated by the projection of the servo beam.

17. The holographic memory reproduction method according

5 to claim 8, wherein shift multiplex recording is performed two-dimensionally on the holographic recording medium, and two-dimensional reproduction position servo-control is performed on the holographic recording medium by means of the diffraction beam generated by the projection of the servo beam.

10 18. The holographic memory reproduction method according

to claim 11, wherein shift multiplex recording is performed two-dimensionally on the holographic recording medium, and two-dimensional reproduction position servo-control is performed on the holographic recording medium by means of the diffraction beam generated by the projection of the servo beam.

15 19. A holographic memory reproduction apparatus in which

a diffraction beam is generated in a recording layer of a holographic recording medium by projecting a reproduction beam onto interference fringes formed by projecting an object beam 20 and a reference beam onto the recording layer to thereby reproduce information from this diffraction beam,

the apparatus comprising a servo optical system in which

a servo beam which satisfies the Bragg condition while at least one of the wavelength, incident angle, and incident 25 direction thereof is different from that of the reproduction

beam is projected onto the interference fringes, whereby the reproduction position servo-control of the holographic recording medium is performed by means of the diffraction beam generated by the projection of the servo beam.

5        20. The holographic memory reproduction apparatus according to claim 19, wherein the servo optical system is configured such that the servo beam is projected along a projection optical axis of the object beam and the direction opposite to that of the object beam.

10      21. The holographic memory reproduction apparatus according to claim 19, wherein the servo optical system is configured such that the servo beam is projected along a projection optical axis of the object beam and the direction the same as that of the object beam.

15      22. The holographic memory reproduction apparatus according to claim 19, wherein the servo optical system is configured such that the servo beam is projected along a projection optical axis of the reference beam and the direction the same as that of the reference beam.

20      23. The holographic memory reproduction apparatus according to claim 19, wherein the servo optical system is configured such that the servo beam is projected along a projection optical axis of the reference beam and one of the direction opposite to that of the reference beam.

25      24. The holographic memory reproduction apparatus

according to any one of claims 19 to 23, wherein the servo optical system is configured such that the servo beam is a plane wave having a beam diameter of 1/100 to 1/10 of the beam diameter of one of the object beam, the reference beam, and

5 the reproduction beam.

25. The holographic memory reproduction apparatus according to any one of claims 19 to 23, wherein shift multiplex recording is performed two-dimensionally on the holographic recording medium, and the servo optical system is configured such that two-dimensional reproduction position

10 servo-control is performed on the holographic recording medium by means of the diffraction beam generated by the projection of the servo beam.

26. The holographic memory reproduction apparatus according to claim 24, wherein shift multiplex recording is performed two-dimensionally on the holographic recording medium, and the servo optical system is configured such that two-dimensional reproduction position servo-control is performed on the holographic recording medium by means of the diffraction beam generated by the projection of the servo beam.

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27. The holographic memory reproduction apparatus according to any one of claims 19 to 23, wherein the servo optical system comprises a servo beam source which emits the servo beam different from the reproduction beam.

25 28. The holographic memory reproduction apparatus

according to claim 24, wherein the servo optical system comprises a servo beam source which emits the servo beam different from the reproduction beam.

29. The holographic memory reproduction apparatus  
5 according to claim 25, wherein the servo optical system comprises a servo beam source which emits the servo beam different from the reproduction beam.

30. The holographic memory reproduction apparatus according to any one of claims 19 to 23, wherein the servo  
10 optical system comprises a reproduction beam splitting apparatus which forms the servo beams by splitting part of the reproduction beam.

31. The holographic memory reproduction apparatus according to claim 24, wherein the servo optical system  
15 comprises a reproduction beam splitting apparatus which forms the servo beams by splitting part of the reproduction beam.

32. The holographic memory reproduction apparatus according to claim 25, wherein the servo optical system comprises a reproduction beam splitting apparatus which forms  
20 the servo beams by splitting part of the reproduction beam.

33. The holographic memory reproduction apparatus according to claim 26, wherein the servo optical system comprises a reproduction beam splitting apparatus which forms the servo beams by splitting part of the reproduction beam.